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September 20, 2000

Federal Communications Commission  
Office of the Secretary  
1919 M St. NW  
Washington, DC 20554

Subject: CC Dockets No. 98-147 and No. 96-98 (FCC00-297)

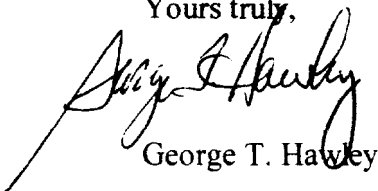
Dear Sir/Madam,

Attached please find four copies of comments from Gluon Networks, Inc. in reference to the Dockets cited above. Also enclosed is a floppy diskette with a copy of this letter and the Gluon, Inc. comments in Microsoft WORD 9.0 format for Intel PC.

According to FCC Public Notice **DA 00-2036** dated September 8, 2000 the comment deadline has been extended to October 12, 2000.

Please let me know if you need any further information.

Yours truly,

  
George T. Hawley

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### **Gluon Networks, Inc. Background Information**

Gluon Networks, Inc. is a privately held "start-up" company with headquarters in Petaluma, CA. Gluon was incorporated in September 1999 for the purpose of planning, designing, manufacturing, and selling a new class of multi-function telecommunications access systems aimed at competitive LECs. Our first system, the Gluon Force-10™ Access Gateway Switch is planned to be available for customer evaluations in mid-2001.

Until the past year or so competitive LECs have had no option other than to purchase equipment designed for incumbent LECs in order to create networks to provide services in order to compete with incumbent LECs. The legacy of arbitrary divisions of labor that derive from Bell System roots resulted in pre-ordained equipment categories like "Class 5 switches" and "digital loop carrier systems" that lose relevance at a time when new service opportunities, advanced technologies, and changing regulatory requirements, including the implementation of the Telecommunications Act of 1996, have emerged. These changes have enabled new service providers (CLECs) to access new revenue streams from consumers at lower costs while occupying incumbent LEC premises (collocation) and accessing unbundled network elements. The premise behind the formation of many new equipment companies, Gluon among them, is that competitive LECs require equipment optimized for their business purposes in order to be able to compete with greatest efficiency. Efficiency is obtained through the incorporation of new multi-function service capabilities, new technologies, and cageless collocation capability into the new equipment designs for the purpose.

The Gluon Force-10 system is designed to facilitate cageless collocation of a multi-function system in a single shelf of plug-in equipment that will, when ready for deployment, occupy about 1/3 of a standard 12 inch deep, 7 feet tall telephone equipment frame. The Gluon system enables the direct unbundling copper loops for voice and DSL connections, performs voice switching as needed, aggregates broadband data and adapts voice and data signals to packet backbone network formats. The intent is to produce a system at a cost that will enable competition to be extended for advanced voice and data services to the smallest telephone central offices in the US. CLECs are presented with the challenge of starting with no customer base. It is therefore vital that they be afforded the opportunity to purchase low cost systems to facilitate getting started, especially in the many smaller markets in the US.

It is Gluon's opinion that the Congress intended competitive communications services to reach out to all consumers in the US, not just those living in the most populous metropolitan areas. It is also Gluon's opinion that it is the intent of Congress that competition not be limited to advanced services but to all telecommunications services from POTS for rural consumers to gigabit data services to large business customers. In order for widespread competition to be extended to the smallest central offices in the US it is Gluon's view that very low cost equipment is required that integrates multiple functions and can be installed in cageless equipment frames.

### **Gluon Networks, Inc. Comments**

In **paragraph 74** of Section V “Second Further Notice of proposed Rulemaking in CC Docket No. 98-147” of FCC 00-297 the Commission invites comment on the meaning of “necessary” as used in Section 251(c)(6). The key words are “interconnection” and “access”. In order for equipment to directly access an unbundled network element, e.g. a physical wire loop pair, in order to terminate a service such as POTS it is necessary for the equipment to incorporate electronic circuits that can work with analog telephone sets, i.e. provide battery for power, collect dialed pulses or tones, provide dial tone, provide ringing signals and so on. Incumbent LECs provide these functions as a necessary part of switches that are installed in their central offices. CLECs often install digital loop carrier systems with these capabilities but in this case are forced to backhaul all calls to a distant switching center in order to provide voice services. If a CLEC wishes to provide local switching of telephone calls with comparable efficiency and quality to the incumbent, the it would be necessary to install a switching system with the POTS circuitry incorporated in order to access the loop for the purpose.

The other key word is “interconnection”. The Telecommunications Act of 1996 amplifies “interconnection” as follows:

INTERCONNECTION- The duty to provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the local exchange carrier's network--

- (A) for the transmission and routing of telephone exchange service and exchange access;
- (B) at any technically feasible point within the carrier's network;
- (C) that is at least equal in quality to that provided by the local exchange carrier to itself or to any subsidiary, affiliate, or any other party to which the carrier provides interconnection; and
- (D) on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, in accordance with the terms and conditions of the agreement and the requirements of this section and section 252.

In (A) above the purpose of interconnection is cited as being “for the transmission and routing of exchange service and exchange access”. Routing of telephone calls is a function of telephone switching equipment or multi-function equipment with switching functionality. Routing of data signals is the forwarding of data packets toward the destination encoded in the data packet, a function of systems called routers or, alternatively, multi-function systems that incorporate routing functionality. Transmission of telephone exchange services and exchange access is the collection, aggregation, and concentration of voice and data signals for transport to a distant location. Equipment types that performs transmission functions are often called multiplexers, digital cross-connect systems, and digital carrier systems or, alternatively, multi-function systems that incorporate transmission functions. If a CLEC is to

perform transmission and routing of telephone exchange services and exchange access through interconnection with the incumbent's unbundled network elements, it is necessary to install equipment in collocation space that incorporates transmission and/or routing functions.

In (C) the interconnection must be of at least equal quality to that provided by the incumbent to itself. This means that, if an incumbent connects local telephone calls within a central office, then in order for a competitor to be interconnected with equal quality for the purpose of providing basic, local telephone calls, it is necessary for the competitor to be able to place equipment in the collocation space that provides switching functions. Otherwise the competitor is required to transport the calls to a distant switching point ("backhaul") and back through a number of additional network elements, adding attenuation, delay, echo, and noise to the connection that the incumbent connections do not experience. On any given competitor connection, the added impairments might be tolerated by the calling and called parties but the statistical mean opinion scores for a body of calls would be measurably lower, yielding lower quality connections overall in contradiction to the Telecommunications Act.

The Commission also asks whether the definition of "necessary" under section 251(c)(6) requires the incumbent LECs to allow physical collocation of multi-functional equipment consistent with the statutory purpose of seeking to ensure competition in areas of advanced technology in telecommunications. Gluon's comment is that reducing the quality of competitor telephone calls and foreclosing the possibility of gaining efficiency through the use of advanced technologies such as multi-function systems by competitive LECs while allowing incumbent LECs to use such equipment would hamper competition in the most obvious way. In effect this would force competitors to play by different rules than incumbents and would deny competitors and their customers the benefits of the highest quality and most cost-effective means of providing telecommunications services.

In **paragraph 75** the Commission asks for alternate definitions of "necessary" after citing the definition in Section 251(d)(2)(A) of the Communications act. Gluon offers the word "hamper" or the word "impede" in place of the word "preclude" in the cited definition. After all, playing without a helmet doesn't preclude someone from playing football but would certainly render that person at a competitive disadvantage. Likewise, denying access by competitive LECs to the most economic means of providing services by denying them the use of multi-functional equipment would place them at a competitive disadvantage inconsistent with the statutory purpose behind section 251(c)(6).

In **paragraph 77** the Commission asks whether Congress intended to restrict collocators to equipment that is not the most efficient for the purpose of interconnection or access to unbundled network elements. Clearly, this is not the case. There would be no point in this vast initiative to overhaul the communications fabric of the country through the encouragement of competition if artificial barriers were created to competition through restricted equipment functionality. Suppose a competitive LEC

were to be able to purchase equipment that lowers the cost of providing services through some added software intelligence that has to do with the management of the equipment more than with its service capabilities. Such functionality, long a hallmark of advancing incumbent equipment, would clearly be in the best interests of competition.

In **paragraph 79** the Commission invites suggestions on “limiting standards” on the functions of collocated equipment. It is Gluon’s opinion that there should be no limitation on specific “functions” of collocated equipment. Equipment functionality should be determined in the marketplace. If a competitive CLEC chooses to purchase at added cost equipment with irrelevant functionality to the purpose of providing competitive telecommunications services, more fool them. It is not the job of the Commission, the incumbents or the legislature to police equipment functionality. One major purpose of the Telecommunications Act was to promote competitive provision of telecommunications services while another was to promote the spread of new and advanced telecommunications services. The only constraints on equipment for collocation should be that the principle purpose of the equipment is to provide or support the provision of telecommunications services and that such equipment should perform in a way not to cause harm or otherwise interfere with the operation of neighboring equipment that shares the central office space.

In **paragraph 80** the Commission asks if multi-function equipment would consume more or less space than equipment with functionalities directly related to interconnection or access to unbundled network elements. In Gluon’s view this is the wrong question. Today digital loop carrier systems are used in collocation space by competitive LECs to unbundle loops for the purpose of aggregating private line and switched voice and other services into a time division multiplexed (TDM) facility for transmission and processing at a remote CLEC central office. Remote switch units are used to unbundle locally switched voice and ISDN loops for the purpose of making local connections where appropriate and forwarding of calls not requiring local connections to a distant host switch in a CLEC CO using a time division multiplexed facility (TDM). DSLAMS are used to unbundle DSL loops for the aggregation of data and voice for transmission in packet form (ATM) to a distant CLEC central office. All three types of equipment are necessary for the interconnection and access to unbundled loops for the telecommunications purposes served. Emerging equipment, one example of which is the Gluon Networks Force-10 System, combines functions of the three different types of equipment into a single unit. Thus, multi-function in this case is the provision of one system that performs the functions of three legacy systems. In this example the multi-function system is equivalently necessary to the uncombined systems and is more efficient. Telecommunications transmission and switching systems have in general two parts of component hardware cost: 1) Common or “overhead” cost that is shared by all of the lines or groups of lines that terminate on the system and 2) per line costs that are dedicated to a single line. Many of the common functions are very similar from system to system. Typically there is a mechanical housing or “shelf” for plug-in cards, there is a printed circuit board that crosses the back of the shelf called a backplane. There are plug-in cards with microprocessors,

memory, and system management communications circuits that are shared by the system. If a backplane, shelf, and common circuits are designed to accommodate multiple product functions, e.g. a combination transmission system and switch, then the cost per line of the common equipment can be reduced, lowering the overall cost of providing services. Where single function systems require unique facilities between the collocation central office and the CLEC central office (TDM connections between digital loop carrier systems and CLEC host voice switches (typically using the GR-303 interface), TDM connections between remote switching units and CLEC host voice switches using manufacturer proprietary interfaces, and ATM connections between DSLAMs and CLEC host ATM switches), more than one facility must be used to accommodate the different connections. Multi-function systems like the Gluon Force-10 System combine all services onto a single packet facility for connection to the CLEC central office, another gain in efficiency. In this way systems that provide multiple telecommunications services, advanced services and service support functions in a multi-function design can offer substantial savings in comparison to single function systems with duplicative connections.